

IN THE CLAIMS:

Claims 1, 6, 10, 14, 20, 23, 26, 31, 35, 39, 45, and 48 have been amended herein. All of the pending claims 1 through 16, 19 through 24, 26 through 41, and 44 through 49 are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

Listing of Claims:

1. (Currently Amended) A semiconductor device comprising:
the semiconductor device having an active surface, at least a portion of said active surface having
a wetting agent layer of about a monolayer thickness thereon, comprising a layer of
solely a silane-based material having no other material therein which undergoes no
substantial degradation thereof during a curing process for a material.
2. (Original) The semiconductor device according to claim 1, wherein said wetting
agent layer includes silane.
3. (Original) The semiconductor device according to claim 1, wherein said wetting
agent layer includes at least one layer.
4. (Original) The semiconductor device according to claim 1, wherein said wetting
agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.
5. (Original) The semiconductor device according to claim 1, wherein said wetting
agent layer reduces surface tension of said active surface.
6. (Currently Amended) A semiconductor assembly comprising:
a semiconductor device having an active surface;
a substrate having an upper surface; and

a wetting agent layer provided on said active surface of said semiconductor device, said wetting agent layer having a thickness of about a monolayer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

7. (Original) The semiconductor assembly according to claim 6, wherein said wetting agent layer includes silane.

8. (Original) The semiconductor assembly according to claim 6, wherein said wetting agent layer includes at least one layer.

9. (Original) The semiconductor assembly according to claim 6, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

10. (Currently Amended) A semiconductor assembly comprising:
a semiconductor device having an active surface;
a substrate having an upper surface;
a wetting agent located on a portion of said active surface of said semiconductor device comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material; and
an underfill material essentially filling a volume located between said substrate and said wetting agent.

11. (Original) The semiconductor assembly according to claim 10, wherein said wetting agent comprises silane.

12. (Original) The semiconductor assembly of claim 10, wherein said wetting agent comprises at least one layer.

13. (Original) The semiconductor assembly according to claim 11, wherein said silane comprises any one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

14. (Currently Amended) A semiconductor assembly comprising:
a semiconductor device having an active surface having at least one bond pad thereon, another surface, a first end, a second end, a first lateral side and a second lateral side;
a substrate having an upper surface having at least one circuit thereon, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall;
at least one bump connecting said at least one bond pad on said active surface of said semiconductor device to said at least one circuit on said upper surface of said substrate, said at least one bump forming a gap between said semiconductor device and said substrate;
an underfill material provided between said substrate and said semiconductor device; and
a wetting agent layer provided on at least a portion of said active surface of said semiconductor device comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material, the underfill material essentially filling a volume between said wetting agent layer and said upper surface of said substrate.

15. (Original) The semiconductor assembly according to claim 14, wherein said wetting agent layer comprises silane.

16. (Previously Presented) The semiconductor assembly according to claim 14, further comprising an additional wetting agent layer provided on at least a portion of said upper surface of said substrate.

17. (Withdrawn) The semiconductor assembly according to claim 14, said substrate further including an aperture extending therethrough.

18. (Withdrawn) The semiconductor assembly according to claim 17, wherein said aperture is located adjacent said another surface of said semiconductor device.

19. (Original) The semiconductor assembly according to claim 14, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

20. (Currently Amended) A semiconductor assembly comprising:
a semiconductor device having an active surface;
a substrate having an upper surface;
an underfill material provided between said substrate and said semiconductor device; and
a wetting agent layer provided on a portion of said active surface of said semiconductor device
and a portion of said upper surface of said substrate, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

21. (Original) The semiconductor assembly according to claim 20, wherein said wetting agent layer comprises at least one layer.

22. (Original) The semiconductor assembly according to claim 20, wherein said wetting agent layer comprises one of silane, glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

23. (Currently Amended) A semiconductor assembly comprising:
a semiconductor device having an active surface having a plurality of bond pads thereon;
a substrate having an upper surface having a plurality of circuits thereon;
a plurality of bumps connecting said plurality of bond pads on said active surface of said semiconductor device to said plurality of circuits on said upper surface of said substrate,

said plurality of bumps forming a gap between said semiconductor device and said substrate; an underfill material provided between said substrate and said semiconductor device; and a wetting agent layer provided on said active surface of said semiconductor device and on said upper surface of said substrate, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

24. (Original) The semiconductor assembly according to claim 23, wherein said underfill material substantially fills said gap between said semiconductor device and said substrate.

25. (Withdrawn) The semiconductor assembly according to claim 23, further comprising an aperture extending through said substrate.

26. (Currently Amended) A semiconductor die comprising: the semiconductor die having an active surface, at least a portion of said active surface having a wetting agent layer of about a monolayer in thickness thereon, said wetting agent layer wetable by a polymeric material, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

27. (Original) The semiconductor die according to claim 26, wherein said wetting agent layer includes silane.

28. (Original) The semiconductor die according to claim 26, wherein said wetting agent layer includes at least one layer.

29. (Original) The semiconductor die according to claim 26, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

30. (Original) The semiconductor device according to claim 26, wherein said wetting agent layer reduces surface tension of said active surface.

31. (Currently Amended) A semiconductor assembly comprising:
a semiconductor die having an active surface;
a substrate having an upper surface; and
a wetting agent layer provided on said active surface of said semiconductor die, said wetting agent layer having a thickness of about a monolayer and wetable by a polymeric material, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

32. (Original) The semiconductor assembly according to claim 31, wherein said wetting agent layer includes silane.

33. (Original) The semiconductor assembly according to claim 31, wherein said wetting agent layer includes at least one layer.

34. (Original) The semiconductor assembly according to claim 31, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

35. (Currently Amended) A semiconductor assembly comprising:
a semiconductor die having an active surface;
a substrate having an upper surface;
a wetting agent located on a portion of said active surface of said semiconductor die, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material; and
an underfill material located between said substrate and said semiconductor die.

36. (Original) The semiconductor assembly according to claim 35, wherein said wetting agent comprises silane.

37. (Original) The semiconductor assembly of claim 35, wherein said wetting agent comprises at least one layer.

38. (Original) The semiconductor assembly according to claim 36, wherein said silane comprises any one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

39. (Currently Amended) A semiconductor assembly comprising:
a semiconductor die having an active surface having at least one bond pad thereon, another surface, a first end, a second end, a first lateral side and a second lateral side;
a substrate having an upper surface having at least one circuit thereon, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall;
at least one bump connecting said at least one bond pad on said active surface of said semiconductor die to said at least one circuit on said upper surface of said substrate, said at least one bump forming a gap between said semiconductor die and said substrate;
an underfill material provided between said substrate and said semiconductor die; and
a wetting agent layer provided on at least a portion of said active surface of said semiconductor die, said wetting agent layer comprising a layer of solely a silane-based material having

no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

40. (Original) The semiconductor assembly according to claim 39, wherein said wetting agent layer comprises silane.

41. (Original) The semiconductor assembly according to claim 39, wherein said underfill material substantially fills said gap between said semiconductor die and said substrate.

42. (Withdrawn) The semiconductor assembly according to claim 39, said substrate further including an aperture extending therethrough.

43. (Withdrawn) The semiconductor assembly according to claim 42, wherein said aperture is located adjacent said another surface of said semiconductor die.

44. (Original) The semiconductor assembly according to claim 39, wherein said wetting agent layer comprises one of glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

45. (Currently Amended) A semiconductor assembly comprising:
a semiconductor die having an active surface;
a substrate having an upper surface;
an underfill material provided between said substrate and said semiconductor die; and
a wetting agent layer provided on a portion of said active surface of said semiconductor die and a portion of said upper surface of said substrate, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

46. (Original) The semiconductor assembly according to claim 45, wherein said wetting agent layer comprises at least one layer.

47. (Original) The semiconductor assembly according to claim 45, wherein said wetting agent layer comprises one of silane, glycidoxypropyltinethoxysilane and ethyltrimethoxysilane.

48. (Currently Amended) A semiconductor assembly comprising:
a semiconductor die having an active surface having a plurality of bond pads thereon;
a substrate having an upper surface having a plurality of circuits thereon;
a plurality of bumps connecting said plurality of bond pads on said active surface of said semiconductor die to said plurality of circuits on said upper surface of said substrate, said plurality of bumps forming a gap between said semiconductor die and said substrate;
an underfill material provided between said substrate and said semiconductor die; and
a wetting agent layer provided on said active surface of said semiconductor die and on said upper surface of said substrate, said wetting agent layer comprising a layer of solely a silane-based material having no other material therein which undergoes no substantial degradation thereof during a curing process for a material.

49. (Original) The semiconductor assembly according to claim 48, wherein said underfill material substantially fills said gap between said semiconductor die and said substrate.

50. (Withdrawn) The semiconductor assembly according to claim 48, further comprising an aperture extending through said substrate.